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Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

527,684

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference B14138.3JCI	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/FR2003/002825	International filing date (*day/month/year*) 25 septembre 2003 (25.09.2003)	Priority date (*day/month/year*) 26 septembre 2002 (26.09.2002)
International Patent Classification (IPC) or national classification and IPC B23K 28/02		
Applicant COMMISSARIAT A L'ENERGIE ATOMIQUE		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 10 avril 2004 (10.04.2004)	Date of completion of this report 24 May 2004 (24.05.2004)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/FR2003/002825

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-7, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the claims:

pages 1-5, as originally filed

pages _____, as amended (together with any statement under Article 19

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the drawings:

pages 1-2, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/FR 03/02825

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-5	YES
	Claims		NO
Inventive step (IS)	Claims	1-5	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-5	YES
	Claims		NO

2. Citations and explanations

0. Clarity

0.1 Claim 1 is unclear (PCT Article 6). It defines a laser welding installation in which the laser is aligned with one of the head bores. However, this is totally inconsistent with figure 1. It is clearly indicated by the description and figure 1 that the laser (9) supplies a beam (10) which is aligned with one of the central bores which extend through the head.

Moreover, it is stated in claim 1 that the head also contains two protection gas ejection ducts which extend through the head and end before and behind the central bores. Owing to this vague and imprecise wording, the orientation of the ejection ducts relative to the three dimensions of the head is not defined and thus the duct outlet is not clearly placed. This wording also includes a lateral position for the duct outlet, which is entirely inconsistent with the object of the present invention, i.e. to provide a welding head capable of entering narrow chamfers. It is clearly indicated by the description (page 3, line 16) that the ducts

open before and behind the central bores in the longitudinal direction of the head. Finally, with regard to the advantages of the invention enumerated on page 3 (lines 18-25), it would be necessary, within the meaning of PCT Article 6, for the following essential features to be defined in claim 1:

a. the ejection ducts extend through the head and end in chambers located before and behind the central bores in the longitudinal direction and extend over a sufficient length in that direction to cover the totality of the molten bath (technical effect of the invention, page 3, lines 21-25)

b. the bore aligned with the beam supplied by the laser and the other, electrode-receiving bore converge, so that the wire is fed substantially along the axis of the laser beam (technical effect of the invention, page 3, lines 19-21).

0.2 Pursuant to PCT Article 6, claim 1 will be examined with the following amendments (written in ***bold italic***) in the present international preliminary examination report:

claim 1:
welding installation ***to produce*** a chamfered joint comprising a laser ***(9) that emits a beam (10)***, a welding wire and a wire-guide electrode, the installation being characterised in that it comprises a head that can enter the chamfer, **the head being elongated** in the directions of the length

and depth of the chamfer and narrow in the ***transverse*** direction of the chamfer, ***said head comprising*** two central bores (13, 15) which extend through the head substantially in the direction of its depth and converge under the head, one of the bores being aligned, ***when the installation is in use, with the beam supplied by*** the laser and the other bore receiving the electrode ***so that the wire is fed substantially along the axis of the laser beam***, and two protection gas ejection ducts (21, 22) extending through the head and ending ***in chambers (23, 24), these chambers being located before and behind the central bores in the longitudinal direction and extending over a sufficient length in that direction to cover the totality of the molten bath.***

1. Citations

This report makes reference to the following documents:

D1: DE 100 17 845 C (FRAUNHOFFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG), 3 January 2002 (2002-01-03)

D2: US-A-4 038 108 (ENGEL ET AL.), 26 July 1977 (1977-07-26)

D3: EP-A-1 013372 (NIPPON STEEL CORP.), 28 June 2000 (2000-06-28), member of the same family as US 2003/038120 A1 (MINAMIDA ET AL.), 27 February 2003 (2003-02-27), which was cited in the search report but was not published in time

2. Claims 1-5

Document D1, which is considered to represent the closest prior art, describes (see the passages of the description cited in the search report; and figure 1) a welding installation suitable for producing a chamfered joint and from which the installation as per claim 1 differs by the following features:

a. two protection gas ejection ducts (21, 22) extend through the head and end ***in chambers (23, 24), these chambers being located before and behind the central bores in the longitudinal direction and extending over a sufficient length in that direction to cover the totality of the molten bath.***

The present invention can therefore be considered to address the problem of developing a welding installation for narrow chamfers which makes it possible to produce a high-quality weld.

The solution to this problem, as proposed in claim 1 of the present application, is considered to involve an inventive step (PCT Article 33(3)) for the following reasons:

a. D1 describes a head which also has an elongated shape in the direction of its length and thickness and which therefore can also enter a chamfered joint (paragraphs 24-25). That head also comprises two bores and a gas ejection duct coupled to the electrode-receiving bore. D1 does not describe a second

gas ejection hole located before the head in the longitudinal direction of the latter, and therefore it cannot ensure a complete coverage of the totality of the molten zone during welding operations. D2 describes a laser cutting process by means of a cutting head which does not comprise gas ejection ducts, nor their respective chambers, the chambers being located before and behind the bores in the longitudinal direction of the head. D3 describes a laser welding head having a single wire used as welding metal. Also in that case, D3 fails to describe the ducts and their associated chambers.

b. None of the documents cited in the international search report describes the features of the ejection ducts and chambers which make it possible to cover the molten bath in its totality.

Claims 2-5 are dependent on claim 1 and therefore also meet the requirements of PCT Article 33(2) and 33(3) for novelty and inventive step.